

## ABSTRACT OF PAPER PRESENTED FOR FULL MEMBERSHIP AT THE BELGIAN SOCIETY OF RADIOLOGY

### BONE

#### Conebeam-CT and fluoroscopy guided percutaneous absolute alcohol sclerotherapy of aneurysmal bone cysts – A single centre experience

J. De Groote, T. Dewaele, L. Defreyne<sup>1</sup>

**Purpose:** Aneurysmal bone cysts are benign bone lesions representing approximately 1% of all bone tumors. Lesions usually manifest in the first or second decade of life and are most frequently eccentrically located in the metaphysis of long tubular bones or in the axial skeleton. Etiologically lesions are considered as benign intra-osseous vascular malformations but can become locally aggressive, with significant extra-osseous expansion. Conventional treatment protocols consisted of surgical curettage, with or without associated bone grafting. In some cases, the localization and extent of the cyst are such that operative treatment is extremely hazardous. Moreover surgical curettage is associated with high recurrence rates varying from 10 to 44%. We present a less invasive treatment option with fluoroscopy and conebeam-CT guided direct percutaneous sclerotherapy with intralesional absolute alcohol injections.

**Material and methods:** Fourteen patients diagnosed with an aneurysmal bone cyst, including 3 axial lesions and 11 lesions in the appendicular skeleton, were treated with direct percutaneous absolute alcohol (ethanol 96%) injections. Patients presented with symptoms of locoregional pain and/or disability including 2 cases with a perilesional pathologic fracture.

Procedures were performed during general anesthesia. Preliminary fluoro-

scopic guided contrast injection and pre injection conebeam-CT ascertained correct needle placement. Intracystic contrast injection confirmed absence of significant venous drainage. The number of treatment sessions differed from one single session to four successive sessions. Maximum dose of ethanol injected during a single session did not exceed 0,5 ml/kg body weight. Three patients had a combined treatment protocol of percutaneous sclerotherapy and endovascular micro-embolisation of local afferent arterioles (with ethanol 96%). Seven patients had previous surgical curettage. Treatment response was evaluated clinically and with imaging using follow-up radiographs, conebeam-CT and/or MRI.

**Results:** Twelve out of 14 patients showed significant clinical improvement post treatment with no residual local pain or disability nor future pathologic fractures. Average time of follow-up was 2 years and 1 month. Imaging response rates, evaluated in 9 patients with follow-up conventional radiography and/or conebeam-CT, showed signs of progressive bone formation at the location of the primary cystic lesions in 9 out of 9 patients. Follow-up MRI illustrated unchanged or reduced volume of the primary blood filled cystic lesions in 10 out of 11 patients with obliteration of typical fluid-fluid levels in 7 out of 11 patients. One patient had final surgical en-bloc resection following initial surgical curettage and 3 sessions of percutaneous sclerotherapy because of partial treatment response. One patient developed osteonecrosis of the talar corpus on follow-up MRI 3 months post treatment of a talar head lesion, treated conservatively with progressive weight bearing. Besides mild post procedural locoregional inflam-

matory symptoms, no other patients presented with significant peri- or postoperative complications.

**Conclusion:** Conebeam-CT and fluoroscopy guided direct percutaneous absolute alcohol injection looks promising as a safe and effective treatment alternative to conventional surgical curettage of aneurysmal bone cysts. The minimal invasiveness of this technique makes successive treatment sessions possible in case of initial partial response or recurrent disease. Guidance with conebeam-CT and fluoroscopy of low dose alcohol injections are rarely associated with local or systemic complications and form an effective technique to induce coagulative necrosis, efferent venous obliteration and secondary sclerosis in aneurysmal bone cysts.

### References

1. Lambot K., Pannier S., Grévent D., et al.: Primary aneurysmal bone cysts in children: percutaneous sclerotherapy with absolute alcohol and proposal of a vascular classification. *Pediatr Radiol*, 2012, 42: 599-605.
  2. Cottalorda J., Bourelle S.: Current treatments of primary aneurysmal bone cysts. *J Pediatr Orthop*, 2006, 15: 155-167.
  3. Cottalorda J., Bourelle S.: Modern concepts of primary aneurysmal bone cyst. *Arch Orthop Trauma Surg*, 2007, 127: 105-114.
  4. Varshney M.K., Rastogi S., Khan S.A., Trikha V.: Is sclerotherapy better than intralesional excision for treating aneurysmal bone cysts? *Clin Orthop Relat Res*, 2010, 468: 1649-1659.
1. Department of Radiology, UZ Gent, Ghent, Belgium.